

MAJOR DISEASES OF FOREST NURSERIES AND PLANTATION IN BANGLADESH

Major Nursery diseases

Read ✓ Disease Host

Damping off

Pine (*Pinus* spp.), *Eucalyptus* spp. Narikeli (*Podocarpus nerifolia*), Raj koro or Chambol (*Albizia richardiana*), Sissoo (*Dalbergia sissoo*) and any other tree species.

Symptoms

Emerging seedlings are attacked by fungus and killed in the soil before germination which is known as pre-emergence damping-off. Seedlings are attacked by one or more fungus on the hypocotyl or roots or both while still in cotyledon stage. Such seedlings may either wilt completely or fall over on the ground because of death and decay of tender tissue of the seedling at collar region. This type of damage is known as post-emergence damping-off.

Pathogens:

Fusarium spp., *Pythium* spp. *Phytophthora* spp., *Rhizoctonia solani*

Control

Damping-off can be largely controlled by ensuring good soil drainage without the application of organic manure and maintaining soil pH 5.00 to 6.0 and moderate density of seedlings. In case of regular high incidence of damping-off, the disease can be prevented by steam sterilization of nursery soil or drenching soil with 2% formalin or application of a range of fungicides such as thiram, captan, copper oxychloride. Soil drenching with BAU-Biofungicide (2% solution).

✓ Disease Host

Root Rot

Gamar (*Gmelina arborea*)

Symptoms

First visible symptoms include reduced growth and dull green colour of leaves compared to deep green colour of normal foliage. This is followed by death of apex of the shoot and gradual dying out of the leaves. Such death occur in irregular patches in the nursery. Small light brown spots appear first on secondary roots which turn brown as decay progresses. At the advanced stages of the rot only the woody tissues of the roots remains.

Pathogen

Fusarium solani

Control

Application of fungicide, Zineb at the rate of 100g/m² area or 0.5% as soil drench in areas of dead, dying and surrounding healthy seedlings.

3. Disease

Root Rot

Host

Teak (*Tectona grandis*)

Symptoms

Root rot of teak appears as gradual death and dying up of leaves beginning from the lower ones. Rots first appear in fine feeder roots which then move into the main tap root where brownish to blackish discolouration develop in the pith and surrounding woody tissues.

Pathogen

Pseudomonas solanacearum

Control

The disease is prevented by raising teak nursery on sites having well draining soil and thereby avoiding water logging condition.

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ROOT ROT

Rubber (*Hevea brasiliensis*)

Yellowing of leaves followed by drying out of seedlings occur due to a rotting of root and collar region is predisposed by water logging condition of nursery beds or polyethylene bags containing the seedlings.

Fusarium sp.

The disease can be largely prevented by avoiding water logging condition of polybag or nursery soil and maintaining better soil aeration by way of breaking and crust formation on top layer of soil. The disease can be controlled by the application of a fungicide Dithane M 45 at the rate of 50g/16 litres of water and applied as soil drench at the onset of early disease symptom.

Dieback

Rubber (*Hevea brasiliensis*)

The symptom first appear as pale green discolouration of the leaves of the grafted shoots, which later on turn yellow and finally dry out. When successfully grafted seedlings in nursery beds are pulled out, roots partly trimmed off and then replanted in large sized polyethene bags where new root regeneration become inadequate and when transpiration loss from leaves exceeds uptake of water by roots, the leaves dry out and die.

Pathogen

Physiological reasons cause this problem. The dieback can be aggravated from secondary attack by *Botryodiplodia theobromae*.

Control

Germinated seeds should be planted in polyethene bags, instead of nursery beds, where grafting should be done. Upon successful grafting, transplanting will be done on the polyethene bag seedlings directly. Thus avoiding root disturbance, the mortality can be avoided.

Dieback

Keora (*Sonneratia apetala*)

At first symptom appear as a rot either at the tip or at the middle or lower part of the stem. A light brown transition zone of infection is seen in the stem tissue of affected seedlings. As rot progresses the portion of the stem further up dies. Small creamy white liquid droplets ooze out from infected portion of the stem within a few days of incubation in a moist chamber. Isolation from such droplets consistently yield a fungus which is the pathogen of the dieback disease of keora.

Pathogen

(*Chaetomella raphigera*)

Control

The disease can be controlled by spraying Dithane M 45 at the rate of 30g/16 litres of water at the early stages of disease incidence. Two or three weekly treatments proved to successfully control the disease.

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Host

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Dieback

Kadam (*Anthocephallus chinensis*)

The disease starts as rot at one or more spots on leaves. Such rots gradually develop and coalesce to form bigger necrotic areas killing both young and old leaves simultaneously. Seedlings with affected leaves exhibit healthy roots.

Rhizoctonia solani

The control measure has not been worked out specifically but seems very likely that at the early stage of spread of the disease application of a foliar fungicide such as copper oxychloride, Dithane M 45 should be good enough to control the disease.

Leaf Spot

Rubber (*H. brasiliensis*)

The symptoms first appear as yellowish brown spots which thereafter turn to pale gray. Later on the spots enlarge and coalesce to give rise to large necrotic areas resulting in the reduction of the photosynthetic potential of the leaves.

Corynespora cassiicola

Application of Dithane M 45 may effectively control the disease.

8. Disease

Host

Symptoms

Pathogen

Control

Birds Eye Spot

Rubber (*H. brasiliensis*)

Another type of leaf spot, commonly known as bird's eye spot is also very commonly seen on leaves of rubber. At the early stage light brown discolouration which ultimately results necrotic spots with pale centre and dark brown margins develop on leaves. This results in premature defoliation, and dieback may occur.

Drechslera heveae (*Helminthosporium oryzae*)

The control measure has not been worked out but information from elsewhere suggests that application of Dithane M 45 may effectively control the disease.

9. Disease

Host

Symptoms

Pathogen

Control

Leaf Spot

Jali bet (*Calamus guruba*)

The disease starts as light brown spots on leaves which later on coalesce to form large irregular spots. In some cases the severity of the leaf spots is such that most of the leaves may be killed so that the affected seedlings dry out.

Guignardia calami

Generally 2 to 3 weekly applications of Dithane M 45 at the rate of 50g fungicide in 16 litres of water and applied at the onset of early symptom expression very often has proved to effectively control the leaf spot on cane.

Read

P.P.

1. Disease

Host

Leaf Blight

Oil palm (*Elueis guineensis*)

Symptoms

The leaf blight appears as small, irregular, light brown spots or patches on the leaf tips or on the edges of leaf blades first on the young leaves and then on older ones. The lesions gradually enlarge and their centres dry out and turn gray. Distinct demarcation between healthy and diseased zone is formed.

Pathogen

Curvularia eragrostides

Control

The leaf blight can be controlled by five foliar sprays at weekly interval with Benlate suspension (0.5%) applied on every 400 seedlings raised in polyethylene bags.

MAJOR PLANTATION DISEASES

P.P. Read
1. Disease

Host

Dieback In Plantation

Keora (*Sonneratia apetala*)

Symptoms

Keora plantations raised prior to 1980 in Coastal Afforestation Divisions of Chittagong, Noakhali, Barisal and Patuakhali amount to 15000 ha. These plantations reveal a high proportion of side branches dying or top dying condition while some were dead. The condition was most severe in Chittagong division slightly less in Barisal and the least in Noakhali coastal plantations.

Keora plantations in Chittagong costal Afforestation Division showed that the trees had thin crown. Most of the trees had only few healthy side branches near the apex. In a small proportion of trees has most of the side branches dead. Insect damage on the bark was also commonly seen. Dying branches showed a clearly defined transition zone of progression of infection in most of the branches. A fungus was consistently associated with the transition zone of infection.

Pathogen

Cytospora sp.

Control

The disease can be controlled by spraying Dithane M 45 at the rate of 30g/16 litres of water at the early stages of disease incidence. Two or three weekly treatments proved to successfully control the disease.

2. Disease

Host

Massive Mortality of Keora In Plantations

Keora (*Sonneratia apetala*)

Symptoms

Death of leaves, twigs, branches and ultimately the whole tree. All trees in some plantations die in progressive succession. Recently dying trees show gradual yellowing of leaves followed by total leaf fall and then progressive drying out of twigs and branches, while the older dead trees loose all the leaves and then dead branches also break-off because of strong wind action. In 1985 only in Char Alim some 75 ha of about 7-8 year old keora plantation was totally damaged.

Causal Factor

The condition is caused by sudden heavy siltation in coastal plantations which covers all the pneumatophores at and around the basal area of keora trees. Thus the aerenchyma of the pneumatophores become deprived of free oxygen supply. Hence, the supply of oxygen through the lenticels of the pneumatophores to the roots tissues is cut off. Such lack of adequate oxygen

hampers normal metabolic activities of the roots, resulting in the death of the roots. At that stage roots can no longer absorb water and minerals for transportation to the shoot, but transpiration loss from the leaves continues which result in the death of the leaves, twigs, branches and ultimately the whole trees.

Control

In order to avoid or reduce the extent of siltation damage to keora plantations, development of a barrier (either a canal to divert sand or a narrow embankment to stop sand against the progressively advancing line of siltations is recommended to be feasible ways to protect the remaining healthy plantations of keora where siltation damage is first noticed.

Bamboo Blight

Bhaluka (*Bambusa balcooa*) and Bhaijja (*B. vulgaris*)

Bamboo produce new culms from buds on subterranean rhizomes during the monsoon, generally from early June until late August. Growth of culms continues until October. Blight of bamboo affects young growing culms, generally within 1 to 5 metres in height. Blight significantly affects culms in August, the disease being at its worst by mid November. Subsequently there is little or no increase in the number of blighted culms. Blight starts as death and decay first of culm sheath and then of culm at nodes which then progresses both up and down the nodes of very young growing culms. With the advancement of decay at the nodes, the young culm breaks at the point of maximum decay. With the development of the remaining healthy portion of the culm a truncated condition is reached. Sometimes, death and decay may totally destroy the whole of a culm. One year old truncated bamboo shows the presence of light brown transition zone of advancing infection on the rind of the culm. Splitting of such portion of the culm would reveal the presence of fine thread like whitish mycelia of a fungus.

Pathogen

Sarocladium oryzae

Control

The bamboo blight can be controlled to a large extent by improving cultural practices such as removal of blighted culms, burning debris *in situ* in clumps in April and adding new soil in and around clumps in April-May before the onset of monsoon. The application of Dithane-M 45 as a soil drench or spray (0.2%) is advisable.

4. Disease

Mistletoes in Plantation

Host

Gamar, Teak and Malakana Koro (*Paraserianthes falcataria*)

Symptoms

Angiospermic parasitic bushes having green foliage and small branches in rather dense clusters are seen to grow on various parts of the crown of the affected trees. These bushes are seen to be very distinct from the host foliage. The parasite produces flowers and fruits. The parasites absorb water and nutrients from the host plant by way of inserting an extensive system of sinker roots into the xylem of the host and thereby hampers host's growth, but the parasite also prepare food through photosynthesis as they have green foliage. As the parasite grows on any particular point of attack, it tries to engulf the host branch and ultimately kills the portion of host branch further up.

Pathogens/mistletoes

Scurrula gracilifolia, *S. parasitica* and *Dendrophthae falcata*

Control

It has been observed that the build up of loranthus is quite rapid after the plantations have been first thinned out on the 5th year. Moreover, areas of plantations, pure or mixed, with a closed canopy have always been observed to

have only very few or no loranthus infestation. There are clear indications that either delayed thinning at the 10th year or just simply excluding thinning of gamar in its 15-year rotation in Pulpwood Plantation Divisions in which case the total biomass production would not be affected but may substantially reduce the build up of loranthus. Alternatively, gamar should be planted in mixture with evergreen species having leading canopy in which case infestation by the parasite of partially shaded gamar canopy would be very minimal. This hypothesis are yet to be tested through field experiments before they are generally employed in large-scale plantation programmes.

5. Disease.

Host

Symptoms

Root Rot of Pyinkado

Pyinkado (*Xylia dollabriformis*)

The first symptom appears as pale green colour of the foliage of the upper portion of the crown which then gradually progresses as light yellow, then yellow and ultimately dries up and fall off. Then the twigs and branches dry up. Examination of the major roots and collar region of dying trees in their early stage show the presence of whitish mycelial mat under the bark in the region of cambium and a white rot of the light brown sap wood is very distinctly seen. The bark become very much permeated by white mycelia of the pathogen. When rot of the major root is advanced and reaches the collar region causing a complete girdle. Absorption of water and nutrients by the root for transportation to the crown is stopped. Then the foliage start drying up as loss of water from leaves in the form of transpiration exceeds that of absorption by the roots. Ultimately the death of the crown results.

Pathogen

Ganoderma lucidum

Control

Disease can be effectively controlled by the use of 2% formalin in water as soil drench during the early stage of symptom expression. Digging out a trench of about 25 cm in width and of 1m in depth around an infected pyinkado tree will arrest further spread of the pathogen to neighbouring trees through rhizomorph. Raising mixed plantations of pyinkado and trees resistant to attack by *G. lucidum* will also help to reduce the build up of infection by the pathogen. Teak (*Tectona grandis*) is known to be resistant to this pathogen.

Dieback and Canker of Jackfruit Trees

Jackfruit (*Artocarpus heterophyllus*)

The first visible symptom of dieback appears as a change of green colour of the leaves to pale green which then progressively change to light yellow, yellow to reddish yellow. The older leaves fall off first followed by younger ones. This may occur on small branches, or on one or more of the major branches simultaneously, or on most of the crown. After the leaves fall off, the branches die. At first small, young branches die which is followed by the older ones. The transition zone of healthy and dead wood of a dying branch is brown in colour. The older dead branches dry up and turn to grayish white.

The cankers on jackfruit trees start as blackening of bark generally at the bases of small dead branchlets. The dead area gradually expands and this is followed by light brown discolouration and death of sap wood underneath. As the tree increases in girth, the canker affected portion fails to add any new growth, and a depression usually develops. On the bark of the dead area small, rounded, reddish-yellow fruit bodies of *Nectria haematococca* develop profusely during the monsoon.

Control

It can be controlled by applying Cupravit, or Dithane M-45 (0.2%).

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Host

Symptom